

Invited Talk

Research Trends in
High-Intensity-Short-Pulse Laser-Plasma Interaction

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**Laser beam propagation, filamentation and channel
formation in laser-produced plasmas***

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The understanding of laser beam propagation through underdense plasmas is of vital importance to inertial confinement fusion schemes, as well as being a fundamental physics issue. The fast ignitor concept, for example, requires the formation of an evacuated channel through a large, underdense plasma. Scaled experiments [1-3] have shown that the axial extent of a channel formed by a 100 ps pulse is limited by the onset of the filamentation instability [4]. We have obtained quantitative comparison between filamentation theory and experiment [1,5]. More recent experiments [6] have shown that by increasing the length of the channel-forming pulse, the filamentation instability is overcome and the channel forms at higher densities. This result has important implications for the fast ignitor design and the understanding of time-dependent beam dynamics.

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